Supplementary Materials

Continent-wide drainage reorganization in North America driven by mantle flow

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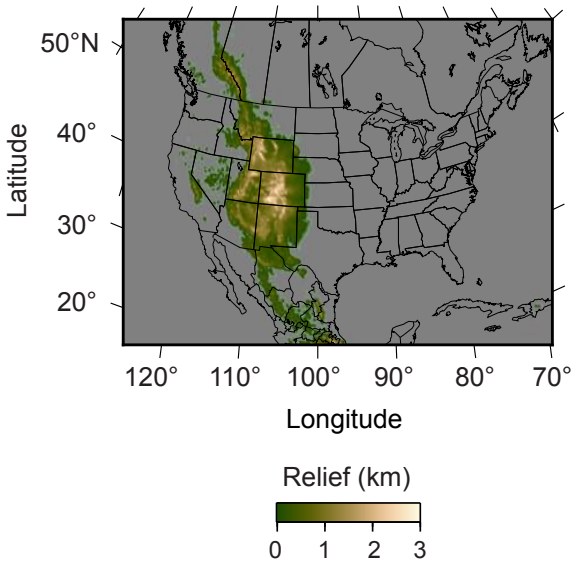
This file contains four supplementary figures

Figures S1, S2, S3 and S4



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18 **Figure S1. Removed Laramide relief.** All elevation higher than 2 km in the Western

19 Cordillera is removed in the initial model, and added back to surface process models

20 uniformly between 80 to 50 Ma to simulate the Laramide uplift.

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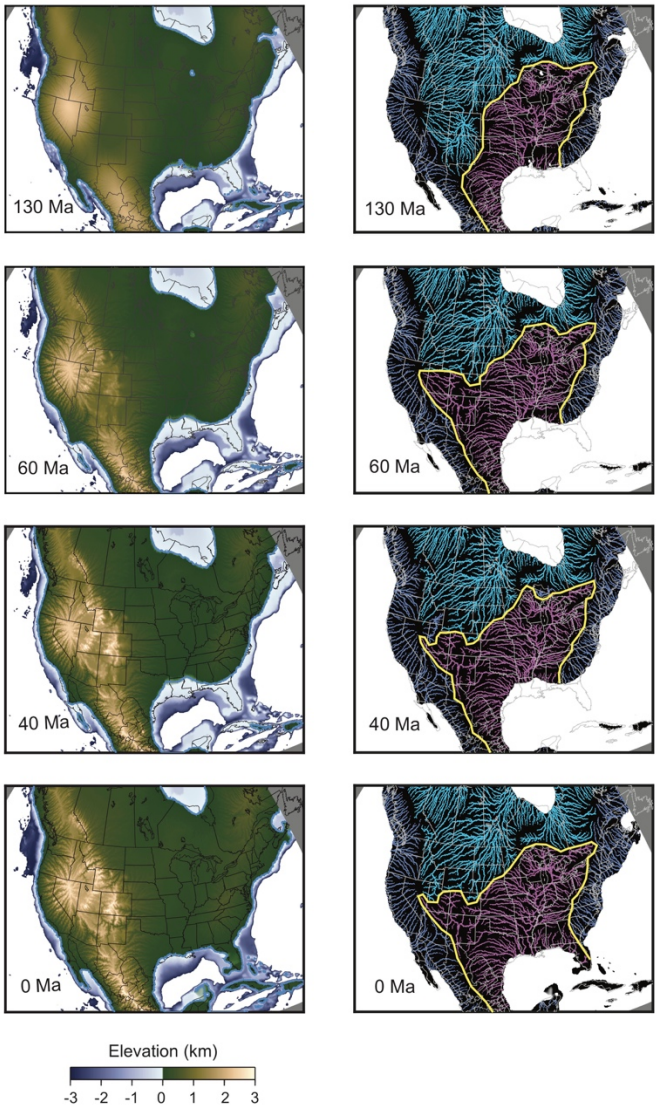
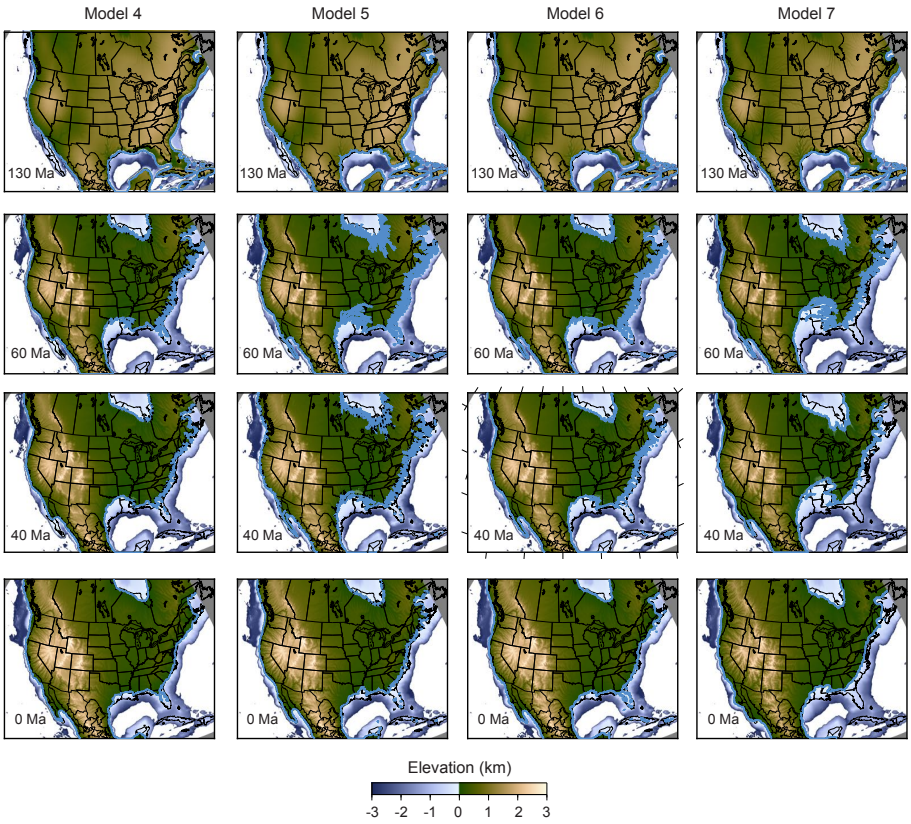


Figure S2. Paleo-elevation (left panel) and paleo-drainage (right panel) of Models 3 in a North American reference frame. This model assumes no dynamic topography influences the landscape. In Comparing Model 3 with 1 and 2 we can see that the way the Laramide uplift modified the river patterns is restricted to the western continent, but is not adequate to influence the broader drainage changes.



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31 **Figure S3. Paleo-elevation maps of Models 4-7 in a North American reference**

32 **frame**. In Model 4, the elastic thickness of continental lithosphere is constant at 40 km;

33 in Model 5, sea level is constant through time; in Model 6, precipitation rate is constant

34 at 1 cm/yr through time; in Model 7, Surface erodibility is fixed at 1×10^{-7} yr^{-1}.

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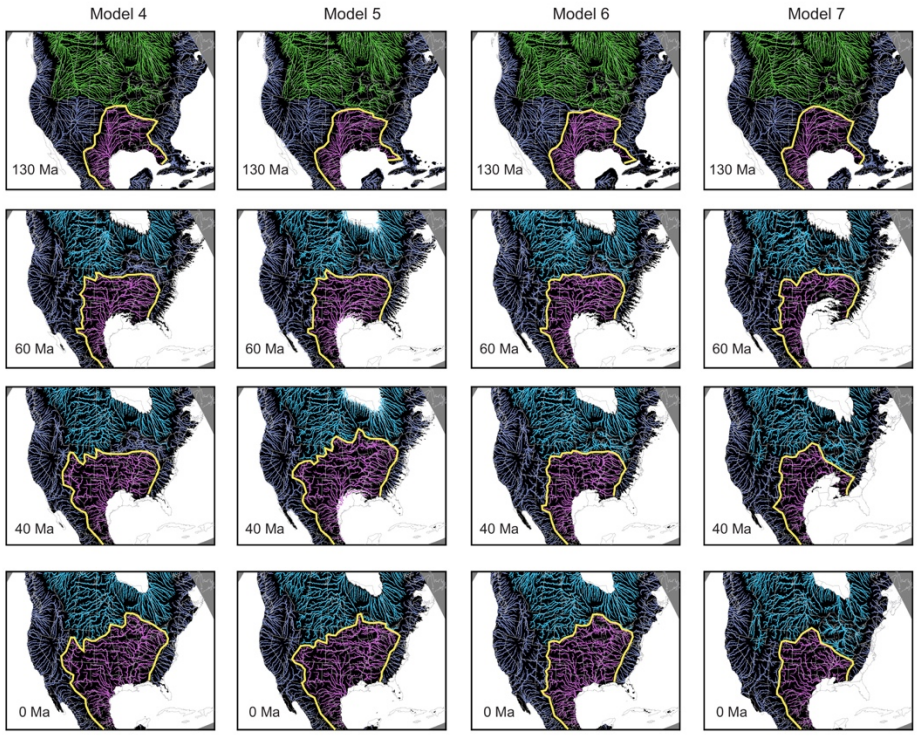

Figure S4. Paleo-drainage of Models 4-7 in a North American reference frame.